Sam Bays received funding from INL's Division Initiatives and Faculty Staff Exchange programs that assisted him in obtaining his doctorate in nuclear fuel cycle analysis of reactor physics May 7. He now is working for INL conducting reactor and fuel cycle analysis.

Sam Bays completes nuclear engineering doctorate with INL support

By Keith Arterburn, *INL Communications*

With rapidly rising world energy prices and an emerging nuclear renaissance, Sam Bays couldn't have arranged better timing to finish his doctorate in nuclear fuel cycle analysis of reactor physics.

Bays, an intelligent and courteous young man from a Kansas farm, defended his doctoral dissertation on April 15 and received his doctorate from the University of Florida on May 7.

His path to this life goal was as serpentine as a winding Idaho mountain trail. It included work at Idaho State University, University of Idaho, University of Florida and Idaho National Laboratory. His stride to the end of that trail was aided by INL's Division Initiatives and Faculty Staff Exchange (FSE) programs, which financed much of his dissertation writing and final calculations during his final year of study.

Bays said, "Division Initiatives made it possible for me to complete my Ph.D. as an employee, instead of limiting my Ph.D. time to only nights and weekends. Their assistance helped me finish my doctorate and master's degrees in five-and-a-half years, and I very much appreciate their support. I hope others can benefit as I have."

Anne Mollberg, Education Programs lead and FSE program manager, said, "We are pleased that our programs have helped produce another talented and enthusiastic nuclear engineer. Even better, INL is benefitting because Sam Bays has accepted a research position here."

Bays said, "My dissertation was focused on advancing our understanding of fast reactors." His thesis demonstrated how a fast reactor could be designed to incorporate a blanket comprised of minor actinide waste that can produce plutonium for use as a reactor fuel. With his thesis, he proposed that advanced burner reactors, which are designed to consume transuranic waste, could be enhanced by these blankets to leverage the available energy from the minor actinide transuranics. This, he showed, could be done by transmuting the minor actinides into plutonium using the blankets.

Bays and his wife, Nikki, got started on the trail to his doctorate at the University of Florida, where he completed his core requirements in 2004. Then, he came to Idaho as an intern at the former Argonne National Laboratory-West in the summer of 2004, which was followed with a one-year fellowship there. The new INL was formed combining Argonne with Idaho National Engineering and Environmental Laboratory in 2005, and Bays remained during that transition.

He continued working at INL from 2005 to 2008 and completed his academic course work, leveraging agreements among the three universities. Bays added, "It is challenging doing it this way. I had to be careful to ensure the University of Florida accepted the courses from both Idaho universities and the work I was doing at INL. I had two customers instead of one."

He added, "One thing that convinced me to stay in Idaho was working with such excellent people who treated me and my wife as a part of the family here. That was 80 to 90 percent of my decision, and then there were the delicious pastries at MFC on Wednesday mornings."

Bays noted that his educational and work experience has been most satisfying saying, "When you deliver at INL, it shows commitment to the laboratory, while at the same time delivering on your academic requirements. INL has reciprocated with a commitment to me during my studies and beyond."

Bays accepted a research position at INL working in reactor and fuel cycle analysis.

Bays hails from a Kansas beef ranching and farming family. He and his brother, Tom, are the first in their family to go to college. Tom Bays has his Doctor of Veterinary Medicine degree. Bays' other brother, Greg, is serving the nation in the U.S. Navy in Italy.

Bays now mentors other nuclear engineering students. He also has been involved locally with the nuclear energy

community. Frequently he talks with young people about career possibilities in nuclear research and often conducts demonstrations at expositions on nuclear issues. On June 21, he and three colleagues traveled to Ashton, Idaho, to participate in a mini-exposition sponsored by the Falls River Electrical Cooperative. Bays explained to about 250 participants nuclear energy basics and the practical applications of nuclear science and technology. He demonstrated the existence of background radioactivity and how radioactive americium is used in smoke detectors to protect families in their homes.

Feature Archive

Bays explains the basics of nuclear science and technology to students attending INL's 2006 Science and Engineering Expo.